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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,325	12/14/2001	Tomohiko Shibata	782_206	8198

25191 7590 10/22/2003

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EXAMINER

IM, JUNGHWA M

ART UNIT PAPER NUMBER

2811

DATE MAILED: 10/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/017,325

Applicant(s)

SHIBATA ET AL.

Examiner

Junghwa M. Im

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Objections*

Claim 1 is objected to because of the following informalities. Claim 1 recites "the Al contents of the third semiconductor nitride" which does not have an antecedent basis.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-7 and 9-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohba (US 5990495).

Regarding claims 1 and 11-13, Fig. 6 of Ohba shows a light emitting semiconductor device comprising a sapphire substrate 10, an AlN layer 11 on the substrate, comprising a first semiconductor nitride, the crystallinity of the AlN being set to have full width at half maximum X-ray rocking curve value of 90 seconds or below (Abstract), a GaN layer 12 on the AlN comprising a second semiconductor nitride, and a semiconductor layer group AlGaIn 13 on the GaN layer, comprising a third semiconductor, the Al content of the third semiconductor nitride set smaller than that of the first semiconductor nitride (col. 6, lines 46-50).

Note that the buffer layer 11 is an underlying layer (col. 2, line 13) and Applicant also discloses the same.

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Regarding claims 3 and 4, Ohba inherently shows that Al content of the first semiconductor nitride is set 50 atomic percentages or over since the AlN layer of Ohba has the same elements to that of instant invention while showing the same characteristics in FWHM of X-ray curve.

Regarding claims 5 and 6, Ohba teaches wherein the AlN layer is formed at least 1100°C by a MOCVD method (col. 3, lines 54-68). In addition, "MOCVD" is a process designation, and would thus not carry patentable weight in this claim drawn to a product. See *In re Thorp*, 227 USPQ 964 (Fed. Cir. 1985).

Regarding claims 7 and 9, Ohba shows the thickness of the corresponding layers from Fig. 1-5.

Regarding claim 10, Fig. 2 of Ohba shows gradual reduction of Al content.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being obvious over Ohba.

Regarding claim 2, Ohba does not explicitly teach that Ga content of the second semiconductor nitride is set not more than that of the third semiconductor nitride. However, Starting on col. 11, line 39, Ohba shows that compositions of the layer formed on the

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underlayer(buffer layer) can be arbitrary, especially teaching that AlGaInN layer (the same composition of the instant invention) on the underlayer(buffer layer) minimizing the crystal defect (col. 11, line 65-col. 112 line 3).

Regarding claim 8, Ohba does not explicitly teach the formation of the surface of the nitride layer of the substrate. However, Ohba discloses the nitrogen gas introduction into the surface of the substrate to grow the buffer layer (Applicant's underlayer) with the treatment preventing the dissociation of the nitrogen atoms from the crystal implying the nitride formation on the surface of the substrate.

### ***Response to Arguments***

Applicant's arguments filed July 22, 2003 have been fully considered but they are not persuasive.

Regarding the Applicant's argument that "Ohba's GaN contact layer 12, which is an active layer that is part of a semiconductor layer group (i.e., n-GaN contact layer 12 through p-GaN contact layer 16) does not correspond to the claimed buffer layer" is not persuasive.

Whether one refers to the layer 12 of Ohba as an active layer or a buffer layer does not structurally distinguish the claimed invention from the disclosure of Ohba. Both Ohba's layer and claimed corresponding buffer layer are layers of GaN. Furthermore, it should be noted that there is no disclosure in the Applicant's specification that no current or electrons flows through the layer 3 or claimed buffer layer. Therefore, other than semantics, there is no structural or functional difference between Ohba and claimed invention.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

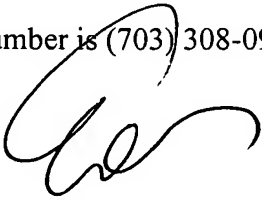
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (703) 305-3998. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

jmi  
October 17, 2003



EDDIE LEE  
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